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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
EVANS, ERIN LINDSAY	
ART UNIT	PAPER NUMBER
1792	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/530,541	KLOTZ ET AL.	
	Examiner	Art Unit	
	ERIN EVANS	1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-19 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-19 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date 06/13/2005.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-2, 4, 7-12, and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Hornberger et al, US Patent 4,917,960. Regarding claim 1, Hornberger et al teaches a coating process comprising applying to a surface a coating composition (coating of aluminum plates with binders, Column 9 lines 26-28) consisting essentially of an alkali metal silicate and an aqueous liquid phase (water-soluble alkali metal silicates as binders in organic liquid, Column 10 lines 42-45) having dispersed therein solid aluminum particles (aluminum powders, Column 9 lines 26-28) to form on the surface a wet coating (dipping or spraying aqueous coating, Column 11 lines 41-45). Hornberger et al teaches the presently claimed conditions of (ii): drying the coating under conditions which form a solid coating which is not electrically conductive (air dried coating, Column 11 lines 55-61) and thereafter treating said non-conductive coating under conditions which convert said non-conductive coating to an electrically conductive, corrosion-resistant coating (electrically and thermally conductivity by curing treatment, Column 9 lines 55-65). The corrosion-resistance would be an inherent characteristic due to the use of the aluminum powder in the coating.

Regarding claims 2 and 4, the coating process of Hornberger et al is applied to metallic and ceramic surfaces (Column 4 lines 11-13) under the conditions of (ii), as described for claim 1.

Regarding claim 7, the process of Hornberger et al, which anticipates present claims 1-2 and 4-5, results in a metallic or ceramic surface coated with an electrically conductive, aluminum-containing silicate coating.

Regarding claim 8, Hornberger et al teaches a coating thickness of about 0.001 inches to about 0.100 inches (Column 12 lines 12-15, the thickness range being equivalent to about 0.025 mils to about 2.5 mils, falling within and essentially overlapping the presently claimed 0.8-3.5 mils). Hornberger et al does not disclose testing the corrosion-resistant properties as in present claim 8. The presently-claimed properties are believed to be an inherent feature of the embodiments disclosed by Hornberger et al as the coating compositions and thicknesses are similar as well as the coating processes (present specification coating process on Page 20 compared with that of Hornberger et al at Column 13 lines 18-22 wherein similar drying and curing conditions are used).

Regarding claims 9-11, as discussed for the corrosion-resistant properties of claim 8 above, Hornberger et al does not discuss the heat resistance, flexibility, or hydraulic-oil resistance of the coated surface, however the presently claimed properties are also believed to be inherent to the disclosed embodiments as they are a result of the metal silicate and aluminum active ingredients subjected to the coating process all of which are common to Hornberger et al.

Regarding claim 12, Hornberger et al discloses a process for converting a solid silicate coating which contains aluminum particles (alkali metal silicate binders, Column 10 lines 42-45, with aluminum powders, Column 9 lines 26-28), which is adhered to a surface (air-dried coating of Column 11 lines 55-56), and which is not electrically conductive to a conductive coating by subjecting the non-conductive coating to conditions which effect expansion of the aluminum particles to place them into intimate contact with one another to the extent that the coating is rendered electrically conductive (thermal treatment to fuse said aluminum particles and create an electrically conductive coating, Column 9 lines 60-65).

Regarding claim 19, the process of Hornberger et al described above in regards to present claim 1 also is used to form a multi-ply coating (see Column 11 lines 55-61) by first applying a layer of the wet coating followed by air-drying (to form first dried coating of Column 11 lines 57-58). The coating application is repeated and thus the composition is applied to the surface of the air-dried coating to form thereon an overlying layer of wet coating. The wet coating is dried under conditions which form a solid multi-ply coating which is not electrically conductive (final drying step in line 59). The multi-ply coating thus formed undergoes conversion to an electrically conductive corrosion-resistant coating during the final curing in the embodiment disclosed in Column 9 lines 56-65).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hornberger et al, US Patent 4,917,960, as applied to claims 1-2, 4 above, in view of Kozuki et al, US Patent 6,156,452.

As discussed in paragraph 3 above, Hornberger et al teaches the invention substantially as claimed but fails to teach burnishing of the coating to convert it to a conductive coating. Hornberger does teach the use of vacuum brazing to combine the coated metal sheets (Column 13 lines 24-25), which is another method of metallurgically bonding interfaces of metals to produce a conductive layer. Kozuki et al teaches methods of bonding metals such as vacuum brazing and ultrasonic welding. Ultrasonic welding is a form of burnishing which uses ultrasonic vibration to compress and bond metals. It is taught that ultrasonic welding is a preferable method of bonding high conductivity metals such as aluminum, can be performed at low temperature, and results in low deformation and high productivity (Column 5 lines 17-35). It would have been obvious to those of ordinary skill in the art at the time of the invention that the ultrasonic welding/burnishing of Kozuki et al could be used in place of the vacuum brazing of Hornberger et al to metallurgically bond the metals and create electrically conductive interfaces. One would have been motivated to combine the teachings of these references and arrive at the present invention in order to provide the low deformation and high productivity as taught by Kozuki et al.

7. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hornberger et al, US Patent 4,917,960, as applied to claims 1-2 above, in view of Baldi, US Patent 4,975,421.

As discussed in paragraph 3 above, Hornberger et al teaches the invention substantially as claimed but fails to teach applying the coating to a metallic surface of a part of a turbine engine. Baldi teaches protecting metal surfaces of jet engine compressor blades by applying top coatings containing powdered aluminum (Column 2 lines 1-8) to provide corrosion resistance (Column 2 line 33). It would have been obvious to those of ordinary skill in the art at the time of the invention that the engine part of Baldi could be coated with the coating of Hornberger et al. One would have been motivated to combine the teachings of the references and arrive at the present invention in order to provide the jet engine surfaces of Baldi, which are subjected to high thermal stresses, with the electrically and thermally conductive coatings of Hornberger.

8. Claims 3 and 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hornberger et al, US Patent 4,917,960, as applied to claims 1-2 above, in view of Baer, US Patent 3,998,779, and as evidenced by the accompanying Data Sheet.

Regarding claim 3, Hornberger et al teaches the process substantially as claimed but fails to teach drying of the wet coating under conditions which directly convert said coating to an electrically conductive, corrosion-resistant, solid coating. Baer teaches that coatings containing aluminum alloy particles in non-metallic adhesive material such as alkali metal silicates (Column 3 lines 8-12 and lines 40-44) can be rendered

electrically conductive according to the amount of powdered alloy material dispersed therein (Column 5, lines 7-10). Thus the drying of the wet coating (curing at 300°F for a half an hour, Column 7 lines 10-14) renders a solid, electrically conductive, corrosion-resistant coating. It would have been obvious to those of ordinary skill in that art at the time of the invention that the coating composition and process described by Baer could be combined with the process taught by Hornberger et al by adjusting the total aluminum powder content in order to provide a direct method of rendering the coating electrically conductive. One would have been motivated to combine the teachings of these references and arrive at the present invention in order to eliminate the additional step and associated costs of the higher temperature curing step taught by Hornberger et al.

Regarding claim 13, as discussed above in paragraph 3, Hornberger et al teaches the coating composition substantially as claimed but fails to teach the use of an additive which is effective in improving the corrosion-resistance of the coating. However, Hornberger et al discloses an embodiment wherein the epoxy resins (Column 5 lines 50-55) as fugitive material remain in the coating composition, said resins forming pores in the coating upon removal (Column 4 lines 14-21). Baer teaches that epoxy resin additives provide resistance to corrosion (Column 3 line 65 - Column 4 line 1) and other outstanding properties such as flexibility (Column 4 lines 7-11). These epoxy resins must be dissolved in solvents, for example the organic solvent diisobutyl ketone (Column 6 lines 29-35). This solvent has very limited miscibility in water (0.05 m/m, see

attached Data Sheet). It would have been obvious to those of ordinary skill in the art at the time of the invention that the resin/organic solution of Baer could be used as the epoxy resin material used by Hornberger et al and that these additives would provide improved characteristics to the coating prior to removal. One would have been motivated to combine the teachings of these references and arrive at the present invention in order to provide the improved coating properties taught by Baer.

Regarding claims 14-16, a miscibility of about 1ml in 100ml in water at 20°C is considered immiscible since miscible substances mix in all proportions (i.e. roughly 100ml per 100ml). The organic solvent used by Baer, diisobutyl ketone has miscibility in water at 20°C, reported in weight percent, of 0.05 % m/m. This translates to roughly 0.06 ml per 100ml of water, which, in terms of miscibility, is about 1ml.

9. Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hornberger et al, US Patent 4,917,960, in view of Baer, US Patent 3,998,779, as applied to claims 3 and 13-16 above, and further in view of Stich et al, US Patent 3,180,746.

As discussed above, Hornberger/Baer teaches the coating composition substantially as claimed. Baer further teaches a total silicate content of 7.3 wt % (Column 7 lines 1-7), as in present claims 17 and 18. The combined references fail to teach using a mixture of sodium silicate and lithium silicate, the weight ratio of sodium silicate to lithium silicate being about 0.25 to 1 to about 4 to 1. Stich et al teaches protective coatings comprising aqueous mixtures of sodium silicates and lithium

silicates with weight ratios of lithium to sodium in the range of 0.75 to 1.00 (Column 1 lines 10-25), which corresponds to a range of sodium silicate to lithium silicate ratios of from 1:1 to 1.333:1, as in present claim 17. Thus, Stich teaches this ratio to be a result effective variable in providing the protective properties of the coatings, such as the adhesive and cementing properties (Column 1 lines 65-68). It would have been obvious to those of ordinary skill in the art at the time of the invention that the silicates of Stich could be used as the silicates in the coatings of Hornberger. One would have been motivated to combine these teachings and arrive at the present invention in order to provide the coatings with adhesive properties as taught by Stich.

Conclusion

10. Claims 1-19 are pending in the application and have been examined.

11. Claims 1-19 are rejected.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ERIN EVANS whose telephone number is (571)270-5354. The examiner can normally be reached on Monday thru Friday, 7am to 4pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Kornnakov can be reached on 571-272-1303. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ERIN EVANS/
Examiner, Art Unit 1792

/Michael Kornakov/
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